
घरेलू उपयोग के लिए
उष्मारोधी फ्लास्क — विशिष्टि

Insulated Flask for Domestic Use —
Specification

ICS 55.100; 67.250

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Utensils, Cutlery Domestic Hardware Sectional Committee had been approved by the Mechanical Engineering Divisional Council.

An insulated flask is an insulated storage vessel that greatly lengthens the time over which its hot or cold content remain hotter or cooler than the flask's surroundings. The gap between the two flasks is stuffed with food grade insulated material which significantly reduces heat transfer by conduction or convection.

While preparing this standard, assistance has been taken from BS EN 12546-1 : 2000 'Materials and articles in contact with foodstuffs. Insulated containers for domestic use: Part 1 Specification for vacuum ware, insulated flasks and jugs'. While implementing this standard, the manufacturer shall ensure compliance with relevant statutory regulations.

The relevant SI units and corresponding conversion factors are given below for guidance:

Pressure 1Pa (Pascal)	= 1 N/m ²
1 kgf/mm ²	= 9.806 65 MPa

The composition of the committee responsible for the formulation of this standard is given in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

INSULATED FLASK FOR DOMESTIC USE — SPECIFICATION

1 SCOPE

1.1 This standard covers minimum requirements of domestic insulated stainless steel flask for storage and maintaining the temperature of hot and cold liquids used for drinking purpose.

1.2 The flask will have stainless steel inner container. The outer container may be of stainless steel or plastic.

NOTE — The flask can be for transporting or table top.

2 REFERENCES

The standard listed below contain provision which, through reference in this text, constitute provision of this standard. At the time of publication, edition was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate possibility of applying the most recent edition of the standard indicated below:

<i>IS No</i>	<i>Title</i>
3565 : 2018	Teats for feeding bottles — Specification (<i>first revision</i>)
5522 : 2014	Stainless steel sheets and strips for utensils — Specification (<i>third revision</i>)
5856 : 2017	Welding consumables — Wire electrodes, strip electrodes, wires and rods for arc welding of stainless and heat resisting steels — Classification (<i>second revision</i>)
9730 : 2008	Non-stick unreinforced plastics coatings on domestic cooking utensils — Specification (<i>first revision</i>)
9806 : 2001	Methods of test for and permissible limits of toxic materials released from ceramicware, vitreous enamelware, glassware and glass-ceramicware in contact with food (<i>first revision</i>)
9845 : 1998	Determination of overall migration of constituents of plastics materials and articles intended to come in contact with foodstuffs — Method of analysis (<i>second revision</i>)

IS No

Title

15997 : 2012 Low nickel austenitic stainless-steel sheet and strip for utensils and kitchen appliances — Specification

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Domestic Stainless Steel Insulated Flask — Flask having two containers having food grade insulating material in between, consisting of either:

- a) Both outer and inner containers stainless steel; or
- b) Outer container food grade plastic and inner stainless steel container.

3.1.1 Normally, the mouth portion of the flask may be narrow or wide for storage or transporting of hot and cold liquid used for drinking.

3.2 Nominal Capacity — Volume of water at room temperature required to fill the inner container, when in upright position, to a level 10 mm below the lowest part of the inserted closure.

3.3 Table Top Use — Flask generally provided with a handle.

3.4 Use for Transportation — Flask is normally provided with a strap, cord or handle.

4 TYPES (SHAPE, SIZE AND NOMINAL CAPACITY)

The stainless-steel insulated flasks normally comes in various capacities from 150 ml to 2 500 ml. The mouth portion (size) comes in typically following two variants:

- a) Wide mouth above 45 mm; and
- b) Narrow mouth 45 mm and below.

NOTE — The design of the flask shall be such that it is easy to clean and prevent accumulation of dirt/muck.

5 MANUFACTURE AND WORKMANSHIP

The shape, size and nominal capacity of the inner container shall be as agreed to between the purchaser and the manufacturer. However, the nominal capacity

of the inner container shall be declared by the manufacturer.

5.1 The flask shall be clean, reasonably free from distortion, dents, wrinkles, wavy surface, colouring, burrs, scratches, pitting, deep tool marks and other surface defects. The design of the flask shall be such that, it is easy to clean and prevent accumulation of dirt.

5.2 The flasks shall be subjected shall be subjected to tests as specified in 7.

5.3 Welding if done, shall be free from welding defects. The welding electrode shall conform to grade 308 or higher grade as per IS 5856. The weld shall be finished properly, so that when a finger is passed on the joint, it shall be smooth.

5.4 Suitable handle or arrangement for suspension may be provided on a stainless steel insulated flask.

6 SAMPLING

For the purpose of conducting the tests, 3 samples of flask of each individual size shall be tested. In the event of 1 of the 3 samples failing the test, additional 7 samples shall be tested and these shall all pass.

7 REQUIREMENTS AND TESTS

7.1 Materials

7.1.1 Inner Containers

The material used to manufacture the inner container shall be stainless steel of grade 304 or higher grade as per IS 5522.

7.1.2 Outer Protective Case and Accessories

Outer protective case and accessories shall be of materials which shall be rigid enough to hold the inner container securely under conditions of use, corrosion resistant and protect it from damage in normal handling.

7.1.2.1 The material used for the outer container shall be of stainless steel as per N2 of IS 15997 or 304 series or higher according to IS 5522. The minimum thickness of the outer container shall be 0.3 mm for flasks with capacity less than 1 000 ml and 0.4 mm for flasks with capacity 1 000 ml and above.

7.1.2.2 Plastic casing

The material used shall be food grade plastic, free from bisphenol A (BPA) and shall have a minimum thickness of 1.5 mm.

7.1.3 The flask, if coated fully or partially externally, shall conform to the thickness test, salt water corrosion test, adhesion test procedures as per IS 9730. The limit for lead and cadmium of the coating shall be as per IS 9806 (see SI No. iv) and v) of Table 1 of IS 9806)

when measured as per standard test method. The minimum thickness of the coating shall be declared by the manufacturer.

7.1.4 Stopper

7.1.4.1 The stopper of the inner container shall be of non-toxic and food grade material (see IS 9845). If stainless steel is used, it shall conform to the material specified for the inner container (see 7.1.1). When fitted to the inner container, it shall not slip off and shall provide a leak proof fitting. The insulation material, if used inside the stopper shall be food grade.

7.1.4.2 If O-ring or washer is provided, it shall be made of food grade silicone, refer to IS 3565 for information on silicone.

7.1.4.3 The O-ring or washer, when visually examined, shall be free from blisters, pinholes, cracks, embedded foreign matters and other defects which may impair their serviceability. No joints are allowed

NOTES

1 Silicone manufacturer's certificate for food grade is acceptable.

2 Only physical and chemical properties of needs to be complied with for silicone O-ring or washer.

7.1.5 Auxiliary Closure

The auxiliary closure(s), also intended for use as drinking cup(s), shall be non-toxic, food grade material and shall not deform under normal conditions of use (see IS 9845). The materials shall not contain bisphenol A (BPA).

7.2 Capacity Test

7.2.1 The nominal capacity of flask may be declared one amongst 150 ml to 2 500 ml. Other capacities may be as agreed to between the purchaser and the manufacturer. The tolerance on the nominal capacity shall be + 5 percent. No negative tolerance is permitted.

7.2.2 Volume of water at room temperature required to fill the insulated container, when in an upright position, to a level 10 mm below the lowest part of the inserted closure.

7.2.2.1 Ensure the flask in empty. Take water in a calibrated jar. Pour the water from the calibrated jar into the flask, to a level 10 mm below the lowest part of the inserted closure. The difference in reading of water level in the calibrated jar is the capacity of the flask.

7.3 Test for Heat Retention Capability

The temperature of water heated to 95 °C (+ 1 °C/–0 °C) and kept in flask, in accordance with the method prescribed in Annex A, when measured at intervals of 1, 6, 12 and 24 h respectively, shall be not less than as given in Table 1.

Table 1 Heat Retention Capability

(Clause 7.3)

Sl No.	Capacity of the Flask (in ml)	Temperature Attained (in °C) for Narrow Mouth				Temperature Attained (in °C) Than for Wide Mouth			
		After 1 h	After 6 h	After 12 h	After 24 h	After 1 h	After 6 h	After 12 h	After 24 h
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	150 - 250	80	60	50	40	80	60	50	40
ii)	251 - 500	88	70	56	42	80	60	50	40
iii)	501 - 750	91	78	60	58	80	60	50	40
iv)	751 - 1 000	92	82	70	60	88	70	56	42
v)	> 1 000	92	82	70	62	90	78	68	50

7.3.1 For routine testing, the flask shall be tested for 1 h, 6 h and 12 h. For type testing, the flask shall be tested for 24 h.

7.4 Test for Cold Retention Capability

The temperature of water cooled to 5 °C and kept in flask, in accordance with the method prescribed in Annex B when measured after 6 h, shall be not greater than as given in Table 2.

Table 2 Cold Retention Capability

(Clause 7.4)

Sl No.	Capacity of the Flask (in ml)	Temperature Attained (in °C) For Narrow Mouth After 6 h	Temperature Attained (in °C) For Wide Mouth After 6 h
(1)	(2)	(3)	(4)
i)	150 - 250	13	14
ii)	251-500	11	12
iii)	501-750	10	11
iv)	751 – 1 000	10	11
v)	> 1 000	09	10

7.5 Impact Resistance Test

7.5.1 Drop Impact Test

7.5.1.1 Fill water in the inner container up to its full capacity at the normal temperature and drop it from the height of 400 mm in a vertical state on a hard wood board of 30 mm or more in thickness fixed horizontally (see Fig. 1).

7.5.1.2 The flask shall be free from defects harmful to use. There shall be no defects such as water leakage, crack, etc. on the flask and comply to heat or cold retention capacity as specified in 7.3 or 7.4 respectively.

7.5.2 Pendulum Impact Test

7.5.2.1 Fill water in the flask up to its full capacity at the normal temperature. Raise the flask to the position of 45 degrees by making the length of the shoulder strap 400 mm as shown in Fig. 2 and make the flask collide with a hard wood board of 30 mm or more in thickness fixed vertically.

7.5.2.2 The flask shall be free from defects harmful to use. There shall be no defects, such as water leakage, crack, etc. on the flask and comply with heat or cold retention capacity as specified in 7.3 or 7.4 respectively.

7.6 Test for Fixing Strength of the Handle

7.6.1 A handle if provided on the flask, shall be subjected to the test as given in 7.6.1.1.

7.6.1.1 Weigh the flask with water filled to its maximum capacity along with the stopper and cup. Gradually apply a load equal to a minimum of six times its mass as shown in Fig. 3. After the maximum load is attained. Keep the load for 5 min and examine the presence of any abnormality.

7.6.2 The flask and handle shall be free from any abnormality after the test.

7.7 Test for Strength of Shoulder Strap

7.7.1 A shoulder strap if provided, shall be subjected to the test as given in 7.7.1.1.

7.7.1.1 Weigh the flask with water filled to its maximum capacity along with the stopper(s) and cup(s). Apply a load, equal to a minimum of ten times its mass as shown in Fig. 4. After the maximum load is attained, keep for 5 min and examine the presence of any abnormality.

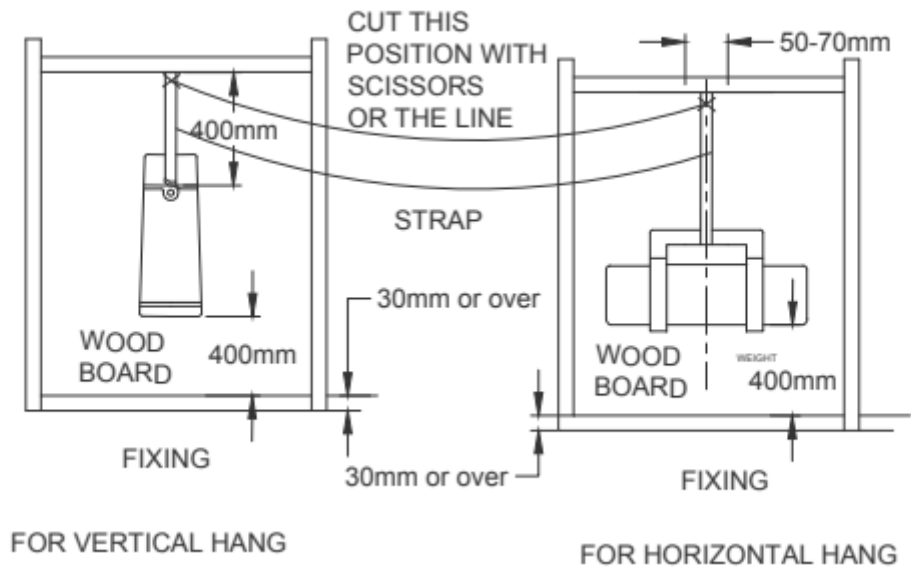


FIG. 1 DROP IMPACT TEST

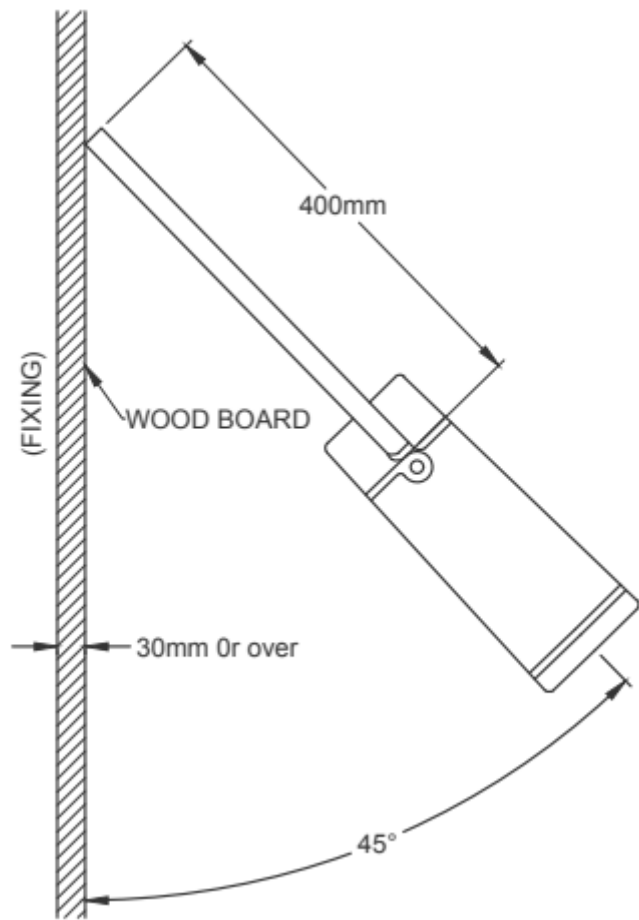


FIG. 2 PENDULUM IMPACT TEST

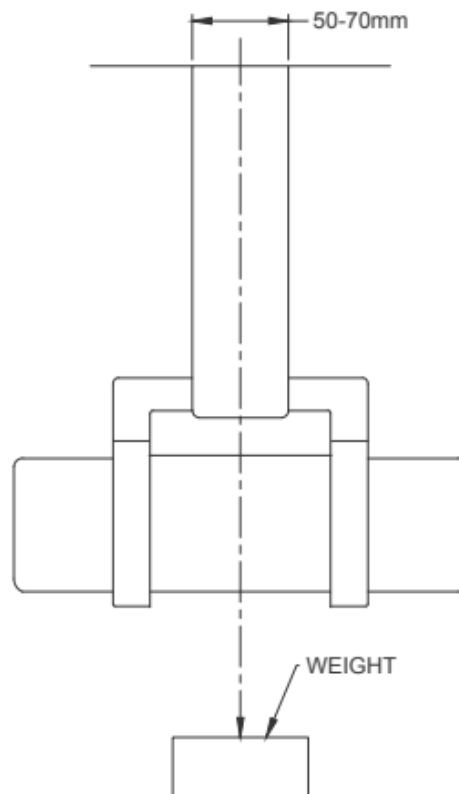


FIG. 3 TEST FOR THE HANDLE

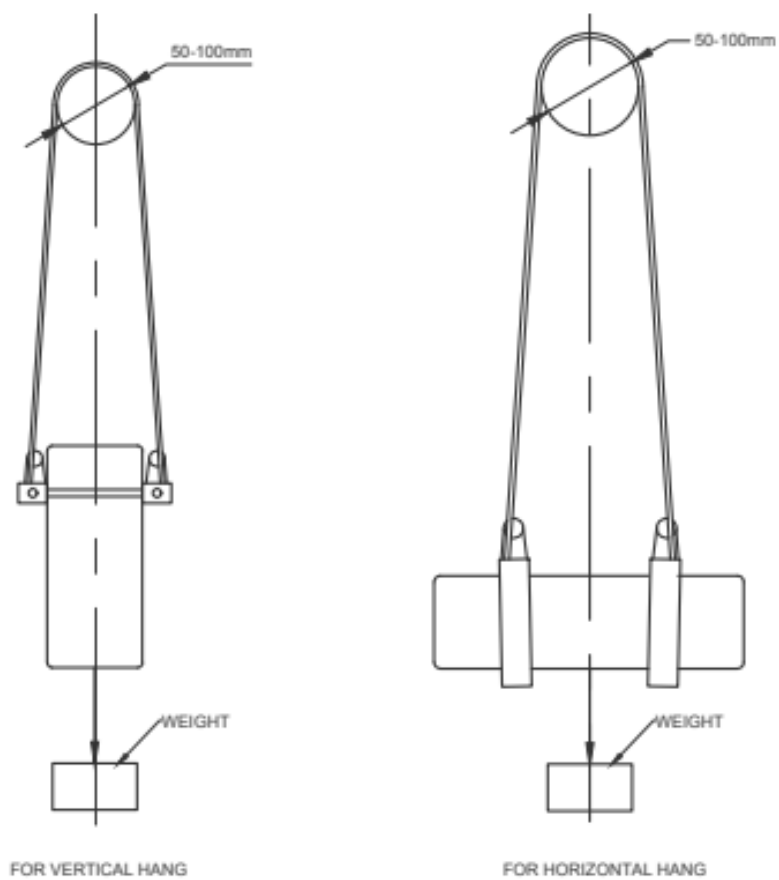


FIG. 4 TEST FOR THE SHOULDER STRAP

7.7.2 After/during this test, the strap shall not break. The area on the flask to which the strap is fastened shall not show any signs of damage or defect. The elongation under load shall not exceed 10 percent of the total length of the strap. Initial stretching due to unwinding of the strap shall not be taken as elongation for the purpose of calculation.

NOTE — The material of the strap may be flexible and shall not be affected by water.

7.8 Test for Strength of Cord

7.8.1 In case instead of a shoulder strap, a cord is provided to tag the bottle to a hook, the strength of the cord shall be subjected to the test as given in **7.8.1.1**.

7.8.1.1 Take a random sample other than that specified in **6**. Put small steel balls equivalent to 3 times the weight (volume/capacity) of water that flask can hold. Hang the filled flask by a suitable means for 30 min. Ensure that flask is hanging freely without touching any surface.

7.8.2 After/during this test, the cord shall not break. The area on the flask to which the cord is fastened shall not show any signs of damage or defect. The elongation under load shall not exceed 10 percent of the total length of the cord. Initial stretching due to unwinding of the cord shall not be taken as elongation for the purpose of calculation.

NOTE — The material of the cord may be flexible and shall not be affected by water.

7.9 Leakage Test

Fill the flask to 75 percent of its nominal capacity with water at 95 °C containing 0.5 percent surfactant. Close the stopper with a torque of 2 Nm or, if not fitted with a screwed stopper, push in the stopper to its full extent. Thoroughly dry the outside of the stopper, spout and outer protective casing (container). Put the flask upside down position for at least 10 min. No drops shall appear on the stopper, spout, casing or on the surface on which the flask has been over turned. The flask shall be tested without the cup, if the flask is provided with a cup along with the stopper

7.10 Joint Leakage Test

The empty flask without stopper or plug or lever shall be weighed (weigh balance accuracy up to 10 mg). The flask shall be dipped fully in a water bath for at least 5 min. After taking out the flask, the inside and outside of the flask shall be wipe dried. The flask shall be weighed again. There shall be no increase in weight of the flask.

7.11 Staining Test

The inner and outer surface of the flask shall be thoroughly washed with hot soapy water. Thoroughly rinse and then degrease the test specimens in acetone or methylated spirits, then wiped using a soft cloth. The flask, when dipped for 16 h in each of the following

solutions maintained at 60 ± 2 °C temperature, shall not show any sign of staining after removal from the solutions at the end of above period:

- a) Ten gram of glacial acetic acid (99 percent) dissolved in distilled water to make 100 ml; and
- b) Five gram of pure sodium chloride dissolved in distilled water to make 100 ml.

7.12 Check for PUF (Polyurethane Foam) or Any Other Similar Thermal Insulation Material

Separate sample other than as specified in **6** is taken and cut to check the declared insulating material. The same sample can be used for checking of container thickness

7.13 Seepage Test

7.13.1 Fill the flask up to 25 percent with blue coloured water (water with blue indelible ink). Close the flask with stopper and cup and shake the flask up and down through a distance of 200 mm $\pm$ 50 mm, 25 times in 15 ± 2 s.

7.13.2 Empty the flask, dry wipe all the exposed surfaces. Dismantle or cut apart the flask and stopper to assess any seepage into the insulation material. There shall be no seepage.

7.14 Lever, Device for Operating or Regulating Flow Test

Operate the lever or device 1 500 times and check for proper functioning, its intended use as per the instructions of the manufacturer

7.15 Test for Length of the Shoulder Strap

The length of the shoulder strap, if provided, shall be 400 mm or over when measured as given in Fig. 5 and the length of strap shall be adjustable.

7.16 Test for Stability of Flask

When the flask filled with water to the full capacity is placed upright over a rough 10° inclined plane, it shall not overturn or fall.

7.17 Pour Test

7.17.1 For purpose of this test, the flask shall be 3/4th filled. A cup with a mouth opening of 60 mm to 80 mm diameter is placed approximately in the centre, above a sheet of white paper of 200 mm x 200 mm. When a black tea or coffee is poured out of the flask from a height of around 50 mm, measured from the pouring edge of the flask to the edge of the cup placed on the white paper, no stains caused by the sputtering shall appear on the white paper.

7.17.2 No spluttering shall occur when liquid is poured out of the flask.

NOTE — After all tests are performed, the sample flask which was tested should pass the leakage test.

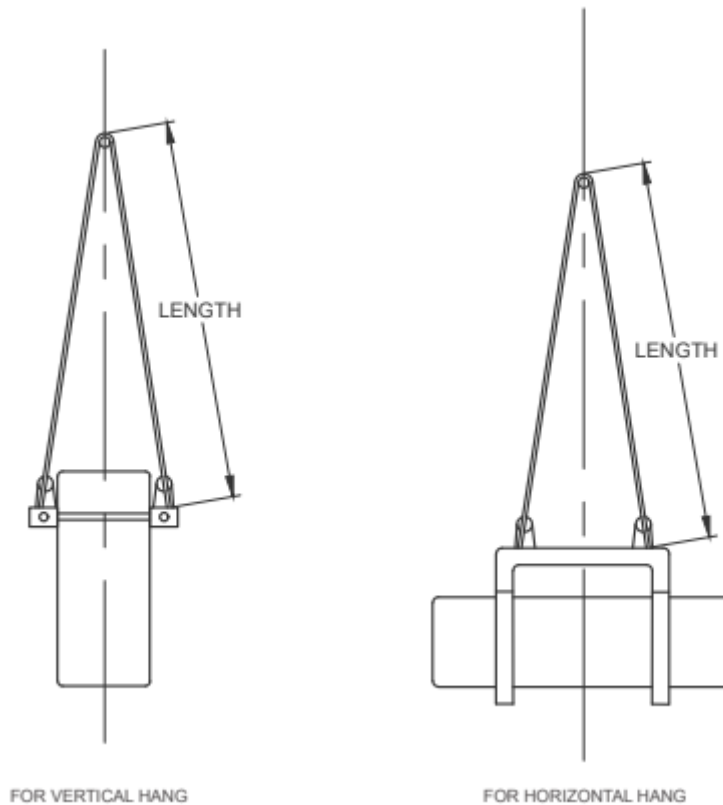


FIG. 5 LENGTH OF THE STRAP

8 INSTRUCTIONS FOR USE

8.1 Flask shall carry adequate instructions to the user for its proper use to ensure satisfactory performance.

8.2 The manufacturer shall provide the following minimum information along with each flask as given below:

- a) How to unpack and take care of environment;
- b) How to stock the flask in case the flask is not going to be used, to avoid pitting or getting contaminated;
- c) Wash thoroughly before and after use;
- d) Always rinse with clean water (preferably warm water) before each use;
- e) Ensure the flask is cleaned, empty and dry before stocking after each use;
- f) Do not use for carrying ice cubes;
- g) Do not use to store or carry carbonated drinks;
- h) In order to minimize bacterial growth, do not use to keep warm milk products or baby food for long. Follow instructions at b), c) above and ensure dry before using warm milk or baby food.
- i) The flask should not stink and should be properly sterilized first with hot water and later rinsed with RO/purified drinking water. Ensure the flask is dry and does not stink;
- j) The flask should be periodically cleaned;
- k) Never use in a dishwasher, unless otherwise stated by the manufacturer;
- m) Never use the flask, if there is suspected leakage between the two containers. Empty the flask and shake the flask there should be no sound of water in between the containers;
- n) Handle the flask carefully, do not drop the flask; and
- p) Keep these instructions safe.

9 MARKING

9.1 Each insulated stainless steel flask shall be legibly and permanently marked with the following minimum information:

- a) Declared nominal capacity;
- b) Grade of material of inner container and outer container along with applicable IS No;

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- c) Name or trade mark of the manufacturer;
- d) Batch number; and
- e) Type of insulation used.

9.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the

Bureau of Indian Standards Act, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

10 PACKAGING

Each insulated container shall be suitable packaged to avoid any damage during transit. The packaging shall be eco-friendly.

ANNEX A

(Clause 7.3)

TEST FOR HEAT RETENTION CAPACITY**A-1 GENERAL**

The heat retention capacity of an insulated flask is determined by filling hot water at 95 ± 2 °C in it, as prescribed in **A-2** and measuring the temperature of water at intervals of 1, 6, 12 and 24 h, respectively. While carrying out the test, maintain the atmospheric conditions at 27 ± 2 °C and 65 ± 5 percent RH. The samples are to be pre-conditioned at 95 ± 2 °C for a minimum period of 2 h before starting the test.

A-2 PROCEDURE

A-2.1 Rinse the flask with water at 95 ± 2 °C, drain out water. Quickly fill with boiling water. Allow the

temperature to drop slowly to 95 °C. Close the flask with stopper and cup and note the time. Note the temperature of water in the flask at the end of 1, 6, 12 or 24 h respectively from the time the water in the flask attained the temperature of 95 °C.

NOTES — In no case shall the flask be disturbed or opened except for measuring the temperature as stated above.

A-2.2 The flask shall be taken as having passed the test, if the temperatures measured at the end of 1, 6, 12 and 24 h are not less than those specified in **7.3**.

ANNEX B

(Clause 7.4)

TEST FOR COLD RETENTION CAPACITY**B-1 GENERAL**

The cold retention capacity of a flask is determined by filling cold water at 5 °C in it, as prescribed in **B-2** and measuring the temperature of water after 6 h. The samples shall be pre-conditioned at 5 ± 1 °C for a minimum period of 2 h before starting the test.

B-2 PROCEDURE

B-2.1 Rinse the flask with water at 5 ± 1 °C, drain out water. Quickly fill flask up to the neck with ice cold

water. Allow the temperature to increase slowly to 5 °C. Close the flask with the stopper and cup and note the time. Note the temperature of water in the flask at the end of 6 h.

NOTE — In no case shall the flask be disturbed or opened except for measuring the temperature as stated above.

B-2.2 The flask shall be taken as having passed the test if the temperature measured at the end of 6 h shall not be greater than that specified in **7.4**.

ANNEX C

(Foreword)

COMMITTEE COMPOSITION

Utensils, Cutlery Domestic Hardware Sectional Committee, MED 33

<i>Organisation</i>	<i>Representative(s)</i>
In Personal Capacity (<i>A-504, K.G Chandra Vista, OMR, Opposite to Satyabhama University, Sholinganallur</i>), Chennai	SHRI G. SHANMUGANATHAN (Chairman)
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Ministry of Defence (DGQA), Kanpur	ER M. SATYANARAYANA SHRI S. J. KOLARKAR (<i>Alternate</i>)
MSME Testing Centre, New Delhi	SHRI S. V. SHARMA SHRI S. S. YADAV (<i>Alternate</i>)
National Metallurgical Laboratory, Jamshedpur	DR S. GHOSH CHOWDHURY DR K. L. SAHOO (<i>Alternate</i>)
Pritam Internation, Baddi	SHRI RAHUL KHERA SHRI ROHIT KHERA (<i>Alternate</i>)

<i>Organisation</i>	<i>Representative(s)</i>
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Sriram Institute for Industrial Research, New Delhi	DR TARSAME SINGH SIAN SHRI ANEESH KUMAR (<i>Alternate</i>)
Steel Authority of India, Salem	SHRI M. VELMURUGAN SHRI N. K. VIJAYAVARGIA (<i>Alternate</i>)
TTK Prestige Ltd, Bengaluru	SHRI ANTO VIMAL ANAND SHRI RAJASEKARAN S. (<i>Alternate</i>)
In Personal Capacity (179, Sri Sai, 13 th Cross, Ananthnagar Phase 1, Electronic City Post), Bengaluru	SHRI B. VISWANATH SHENOY
BIS Directorate General	SHRI RAJNEESH KHOSLA, SCIENTIST 'E' AND HEAD (MED) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary

SHRI CHANDAN GUPTA
SCIENTIST 'D' (MED), BIS

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

	Telephones
Central : 601/A, Konnectus Tower-1, 6 th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	{ 2323 7617
Eastern : 8 th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	{ 2367 0012 2320 9474
Northern : Plot No. 4-A, Sector 27-B, Madhya Marg Chandigarh 160019	{ 265 9930
Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	{ 2254 1442 2254 1216
Western : Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	{ 2821 8093

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. CHANDIGARH. CHENNAI. COIMBATORE. DEHRADUN. DELHI. FARIDABAD. GHAZIABAD. GUWAHATI. HIMACHAL PRADESH. HUBLI. HYDERABAD. JAIPUR. JAMMU & KASHMIR. JAMSHEDPUR. KOCHI. KOLKATA. LUCKNOW. MADURAI. MUMBAI. NAGPUR. NOIDA. PANIPAT. PATNA. PUNE. RAIPUR. RAJKOT. SURAT. VISAKHAPATNAM.